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| 10/576,468 | 04/20/2006 | Katsumi Yabusaki | 287117US0PCT | 7180 |
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| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | EXAMINER ISSAC, ROY P | |
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| | | | 1623 | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/576,468

Applicant(s)

YABUSAKI, KATSUMI

Examiner

Roy P. Issac

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/04/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

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DETAILED ACTION

This Office Action is in response to Applicant's amendment/ remarks/ response filed 7/25/07, wherein claims 1-4 and 8 have been amended, and claims 9-18 have been newly submitted.

The following are new grounds of rejections necessitated by applicants' amendments:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant's amendment with respect to amended claims herein has been fully considered but is deemed to insert new matter into the claims since the specification as originally filed does not provide support for applicants' recitation of "phosphate of cellulose II". The phrase is broader than the described recitation, "cellulose II phosphate ester", since it appears to include other forms of phosphate bonds as well as phosphate groups non-covalently attached to cellulose II.

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Consequently, there is nothing within the instant specification which would lead the artisan in the field to believe that Applicant was in possession of the invention as it is now claimed. See *Vas-Cath Inc. v. Mahurkar*, 19 USPQ 2d 1111, CAFC 1991, see also *In re Winkhaus*, 188 USPQ 129, CCPA 1975.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation, "phosphate of Cellulose II" does not clearly convey to one of skill in the art whether the claims are directed to phosphate attached to cellulose or whether a compound in which cellulose is bonded to phosphate.

The following are new or modified rejections necessitated by Applicant's amendment filed 7/25/07, wherein the limitations in pending claims 1-4 and 8 as amended now have been changed and claims 5-8 depend from claim 4, and claims 9-18 are newly submitted. The limitations in the amended claims have been changed and the breadth and scope of those claims have been changed. Therefore, rejections from the previous Office Action, mailed 7/25/07, have been modified and are listed below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation "may be partially carbamidated" and "may by partly carbamidated" renders these claims indefinite. It is not clear whether the cellulose is carbamidated and as such one of ordinary skill in the art would not be apprised of the metes and bounds the claims herein.

Response to Arguments

Applicant's arguments filed 7/25/07 have been fully considered but they are not persuasive. Applicants argue that, the amendment specifying the amount of phosphorylation overcomes the rejection for indefiniteness over the phrase, "may be carbamidated." This argument was found unpersuasive since its still not clear to one of skill in the art whether carbamidation is required. The carbamidation at any level appears to be optional. Applicants' further argue that the amount of carbamidation is not critical. However, it still remains an element of the claim and one of skill in the art would not able to ascertain the metes and bounds of the claim herein. The rejection is still deemed proper and is adhered to.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pieschel (U.S. Patent No. 6,579,977; Of record) in view of Hiroka et. al. (U.S. Patent No. 4,981,515; Of record) further in view of applicants' admissions.

Pieschel et. al. discloses a process for producing biosorbents by phosphorylation of cellulose containing materials with phosphoric acid. (Abstract; Example 1, Column 6-7). A phosphorous content of 5-10% is disclosed, which overlaps with the ranges claimed herein. (Abstract). Pieschell further discloses that phosphate groups and carbamide groups provide very high sorption performances for heavy metals. (Column 6, lines 38-48). Pieschel further discloses the use of the modified cellulose in columns. (Column 6, lines 48-55). Note that columns are considered to be in cylindrical shapes. Pieschell et. al. discloses the invention as useful for removing heavy metals from aqueous solutions.

Pieschell et. al. does not expressly disclose the phosphorylation of Cellulose II and its use as adsorbants for metals or the arrangement of the modified cellulose in water tanks or disclose the degree of carbamidation.

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Applicants' admit that there is no criticality of amount for carbamidation and that one skilled in the art can determine the applicable amounts of carbamidation. (See arguments/ response filed 7/25/2007, page 8.)

Hiroka et. al. discloses a method for producing regenerated cellulose (also known as cellulose II) with high adsorption properties and flame retardant properties. (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphorylated Cellulose II as a metal adsorbing material since Pieschell et. al. discloses a method for phosphorylating cellulose and Hiroka et. al. discloses a method for producing regenerated cellulose with strong adsorption and flame retardant properties. Furthermore, it is considered well within the basic skills of one ordinary skill in the art to modify regenerated cellulose, a large set of commercially available products, using the method disclosed by Pieschell to produce regenerated cellulose with adsorbent properties. Furthermore, it would have been obvious to one of ordinary skill in the art to use another polymorph of cellulose, cellulose II to phosphorylate or functionalize with carbamidate and use as adsorbants for metals and in columns and bags and in water storage tanks. Furthermore, the recitations "metal-adsorbing material", "metal-adsorbing system" and "anion-adsorbing material" are considered recitations of intended use of the composition. Note that it is well settled that "intended use" of a composition or product, e.g., "a metal-adsorbing system", will not further limit claims drawn to a composition or product, so long as the prior art discloses the same composition comprising the same ingredients in an effective

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amount, as the instantly claimed. See, e.g., *Ex parte Masham*, 2 USPQ2d 1647 (1987) and *In re Hack* 114, USPQ 161. Since cellulose exists in limited forms (I-IV) with cellulose II being one of the well known polymorphs of cellulose I, one of ordinary skilled in the art would have recognized as cellulose II as a potential ingredient used in place of cellulose I from a limited number of forms of cellulose. Thus, the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. It has been held that it is within the skill in the art to select optimal parameters, such as amounts of ingredients, in a composition in order to achieve a beneficial effect. See *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 534 (CCPA 1982). All the claimed steps herein are known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Therefore, one of ordinary skill in the art would have reasonably expected that the phosphorylation of cellulose II would have resulted in substantially similar or better effects.

Thus the claimed invention as a whole is clearly prima facie obvious over the combined teachings of the prior art.

Response to Arguments

Applicant's arguments filed 7/25/07 have been fully considered but they are not persuasive. Applicants argue that there is no foreseeability that the replacement of Cellulose I with Cellulose II would have resulted in the present invention. However, there is a limited number of well recognized polymorphs of cellulose (Cellulose I-IV), and Cellulose II is among the most widely used polymorphs of cellulose. As such, one of ordinary skill in the art would have had used cellulose II in place of cellulose I to achieve beneficial effects arriving at the instant invention. Such changes are considered within the routine skills of one of ordinary skill in the art, and amounts to nothing more than optimization of the invention disclosed in Pieschel's by changing one ingredient for another well known ingredient. Thus, the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. The rejection under section 103(a) is still deemed proper and is adhered to.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clermont et. al. (CA868344; Of record) in view of Pieschel et. al. (U.S. Patent No. 6,579,977; Of record) further in view of applicants' admissions.

Clermont et. al. discloses a method for phosphorylation of cellulosic material by reaction with phosphorous pentoxide, a phosphorous oxide. (Page 7, lines 1-5; Pages 3-5, Examples 1-10). Clermont further discloses ion exchange properties for phosphorylated cellulose. (Page 6, Paragraph 2). Metal adsorption is considered an

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ion-exchange process. Clermont et. al. further discloses the use of mercerized or aged alkali cellulose. (Page 2, Paragraph 2). Note that regenerated cellulose by dissolution in alkali is considered cellulose II. Mercerization also involves addition of sodium hydroxide to cellulose, and the resultant cellulose is considered regenerated cellulose or the cellulose II polymorph.

Clermont does not exemplify Cellulose II phosphate or the packing in a column or in a form of a bag or cylinder or its use arrangement in water-tank or the carbamidation of cellulose.

The disclosure of Pieschel is discussed above.

Applicants' admit that there is no criticality of amount for carbamidation and that one skilled in the art can determine the applicable amounts of carbamidation. (See arguments/ response filed 7/25/2007, page 8.)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphorylated Cellulose II as a metal adsorbing material since Clermont et. al. discloses the use of phosphorylation of a variety of cellulosic materials including regenerated cellulose to ion-exchange purposes, and Pieschell et. al. discloses a method for phosphorylating cellulose and the advantages of phosphorylation and carbamidation in adsorbance properties. Since cellulose exists in limited forms (I-IV) with cellulose II being one of the well known polymorphs of cellulose I, one of ordinary skilled in the art would have recognized as cellulose II as a potential ingredient used in place of cellulose I from a limited number of forms of cellulose. Furthermore, it is considered well within the basic skills of one ordinary skill in the art to

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modify regenerated cellulose, a large set of commercially available products, using the method disclosed by Pieschell to produce regenerated cellulose with adsorbent properties. Furthermore, it would have been obvious to one of ordinary skill in the art to use another polymorph of cellulose, cellulose II to phosphorylate or functionalize with carbamate and use as adsorbants for metals and in columns and bags and in water storage tanks. As noted above, the recitations "metal-adsorbing material", "metal-adsorbing system" and "anion-adsorbing material" are considered recitations of intended use of the composition.

Since cellulose exists in limited forms with cellulose II being one of the well known polymorphs of cellulose I, one of ordinary skilled in the art would have recognized as cellulose II as a potential ingredient used in place of cellulose I from a limited number of forms of cellulose. Thus, the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. Furthermore, it has been held that it is within the skill in the art to select optimal parameters, such as amounts of ingredients, in a composition in order to achieve a beneficial effect. See *In re Boesch*, 205 USPQ 215 (CCPA 1980). All the claimed steps herein are known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

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Therefore, one of ordinary skill in the art would have reasonably expected that the phosphorylation and carbamation of cellulose II would have resulted in substantially similar or better effects.

Thus the claimed invention as a whole is clearly prima facie obvious over the combined teachings of the prior art.

Response to Arguments

Applicant's arguments filed 7/25/07 have been fully considered but they are not persuasive. Applicants argue that, Clermont does not disclose metal ion adsorption property for phosphorylated cellulose or suggest the instant phosphorylation degrees. However, metal ion adsorption is an ion-exchange process in which the prosphorous groups bind to metal ions which was well recognized by Clermont and Pieschel et. al. also discloses the use of phosphorylated cellulose for metal adsorption. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The rejection under section 103(a) is still deemed proper and is adhered to.

Conclusion

No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roy P. Issac whose telephone number is 571-272-2674. The examiner can normally be reached on 9:00-5:00.

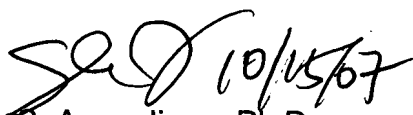
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia Anna Jiang can be reached on 571-272-0627. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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